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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,660	12/05/2003	In-kyu Park	030681-456	7457
21839	7590	05/16/2006	EXAMINER	
BUCHANAN INGERSOLL PC (INCLUDING BURNS, DOANE, SWECKER & MATHIS) POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			MARIAM, DANIEL G	
			ART UNIT	PAPER NUMBER
			2624	

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/727,660

Applicant(s)

PARK ET AL.

Examiner

DANIEL G. MARIAM

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 11-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/15/04 & 2/10/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election with traverse of Group II in the reply filed on April 21, 2006 is acknowledged. The traversal is on the ground(s) that the search required of the Group II claims would logically encompass the search required for the Group I claims. Hence, the restriction is improper because a thorough examination of claims 8-20 would overlap and encompass the effort required for examining claim 1. Therefore, no undue burden sufficient to justify restriction is present, and the restriction should be withdrawn as not in compliance with MPEP 803. The traversal is convincing, and the restriction requirement is withdrawn.

Claim Objections

2. Claim 15 is objected to under 37 CFR 1.75(c) as being in improper form. While claim 15 refers back to more than one claim by the language "one of", the claim identifies only claim 8 as its dependent. The Examiner assumed claim 15 as being dependant on a single claim 8 for the purpose of examining the claim. Appropriate correction is required (MPEP § 608.01(n)).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite. A single claim, which claims both an apparatus and the method steps of using the apparatus, is indefinite. The claim can be modified by deleting the language "the method of claim 1".

Since claims 17-20 directly or indirectly depend on claim 16, they are also rejected under 35 U.S.C. 112, second paragraph, for the same reason set forth above for claim 16.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO “Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility” (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. *O'Reilly*, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

... a signal does not fall within one of the four statutory classes of Sec. 101.

... signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claims 7 and 15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 7 and 15 are drawn to functional descriptive material recorded on a computer readable medium. Normally, the claims would be statutory. However, the specification, at page 14 defines the claimed computer readable medium as encompassing statutory media such as a “ROMs”, “hard disks”, “optical drives, such as CD ROMs, DVDs”, as well as *non-statutory* subject matter such as a “carrier waves, e.g., transmissions over the internet”.

A “carrier wave” embodying functional descriptive material is neither a process nor a product (i.e., a tangible “thing”) and therefore does not fall within one of the four statutory

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classes of § 101. Rather, “carrier wave” is a form of energy, in the absence of any physical structure or tangible material.

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as carrier waves. Any amendment to the claim should be commensurate with its corresponding disclosure. The Examiner suggests the following language to overcome the rejection.

Claim 7. A computer readable memory having a perceptual 3-dimensional (3D) shape descriptor formed by the method according to claim 1.

Claim 15. A computer readable memory having embodied thereon a computer program for the method according to claim 8.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 7-10, and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Hiraga, et al. (US Patent Application Publication 2005/0002571).

With regard to claim 1, Hiraga, et al discloses a method of perceptual, i.e., human

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intuition, 3-dimensional (3D) shape description (See for example, paragraphs 0046 through 0051; and paragraph 0166), the method comprising: generating nodes that respectively correspond to parts of a part-based representation of a 3D shape model, the nodes including unary attributes, i.e., area, leaf, Morse function, etc, of the parts, generating edges that include relational attributes between the nodes; and generating an attributed relational graph, i.e., Reeb graph, of the 3D shape model that is comprised of the nodes and the edges (See for example, paragraphs 0068 through 0078; and paragraphs 00126 through 0138; and Figs. 2 & 8-10).

With regard to claim 7, Hiraga, et al further discloses a computer readable medium having a perceptual 3-dimensional (See Fig. 16).

With regard to claim 8, a method of searching a database of 3-dimensional (3D) graphics models described by the method of claim 1 (See for example, paragraph 00169), the method comprising: receiving a query 3D graphics model (See for example, item 12, in Fig. 16; paragraph 0175)); transforming the received 3D graphics model into a perceptual 3D shape descriptor (See for example, items 16, and 18, in Fig. 16; and paragraphs 0176-0182), and comparing, i.e., matching, the perceptual 3D shape descriptor with each of the perceptual 3D shape descriptors of the 3D graphics models stored in the database, i.e., 3D DB, to retrieve the 3D graphic models that are similar to the perceptual 3D shape descriptor (See for example, item 26, in Fig. 16; and paragraphs 0183 through 0184).

With regard to claim 9, the method of claim 8, wherein the receiving of the query 3D graphics model comprises a user designing and inputting a 3D graphics model by means of an interactive tool (See for example, item 12, in Fig. 16; and item 104, in Fig. 17).

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With regard to claim 10. The method of claim 8, wherein the transforming of the received 3D graphic models into the perceptual 3D shape descriptor comprises a user editing the transformed 3D shape descriptor if required (See paragraphs 0191-0192).

With regard to claim 15, Hiraga, et al further discloses a computer readable medium having embodied thereon a computer program for the method according to any one of claim 8 (See for example, Fig. 16).

Claim 16 is rejected the same as 8 except claim 16 is an apparatus claim. Thus, argument analogous to that presented above for claim 8 is applicable to claim 16. Applicants' attention is further invited to Figure 16.

Claim 17 is rejected the same as 9 except claim 17 is an apparatus claim. Thus, argument analogous to that presented above for claim 9 is applicable to claim 17. Applicants' attention is further invited to Figure 16.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2—6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiraga, et al. (USPGPUB 2005/0002571) in view of Zaharia, et al (3D Shape-based retrieval within the MPEG-7 framework).

With regard to claim 2, Hiraga, et al (hereinafter "Hiraga") discloses all of the claimed

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subject matter as already addressed above for claim 1, and incorporated herein by reference.

Hiraga does not expressly call for wherein each of the nodes is represented by an ellipsoid parameterized by a volume, a convexity, and eccentricities. However, Zaharia, et al. (See for example, section 1, page 134) teaches this feature. Hiraga and Zaharia, et al are combinable because they are from the same field of endeavor, i.e., 3D shape searching and retrieving (See for example, section 1, pp. 133-134). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Hiraga with Zaharia, et al. The motivation for doing so is to represent the nodes by an ellipsoid parameterized by a volume, a convexity, and eccentricities, and to do so would at least improve the recognition and/or searching process. Therefore, it would have been obvious to combine Zaharia, et al with Hiraga to obtain the invention as specified in claim 2.

With regard to claim 3, the method of claim 1, wherein the unary attributes of the nodes comprise at least a volume, eccentricities, and a convexity (See page 134 of Zaharia, et al).

With regard to claim 4, the method of claim 2, wherein the unary attributes of each of the nodes comprise variances that correspond to the degrees of distribution of voxels approximated by the ellipsoid on 3D principal axes, the origin of the ellipsoid, and the transformation of the node in an object-oriented coordinated system (See pages 134-136 of Zaharia, et al).

With regard to claim 5, the method of claim 2, wherein the relational attributes comprise at least the distance between the centers of the ellipsoids, the angle between the first principal axes of ellipsoids, and the angle between the second principal axes of the ellipsoids (See page 134 of Zaharia, et al).

With regard to claim 6, wherein quantizing the unary attributes of the nodes by a predetermined number of bits (broadly reads on section 6, lines 5-10 of Zaharia), and it also would have been obvious if not inherent that the shape analyzer shown in Figure 16 of Hiraga, which is carried out with a personal computer indeed requires to store the various attributes of the nodes of the 3D data with a predetermined number of bits, and to do so would at least minimize the cost associated with data storage (See for example, paragraph 0081).

Allowable Subject Matter

10. Claims 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion


11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Numbers: 5982923, 6323863, and 6512995; US Patent Application Publication 2005/0168460; and a Publication to: Han, et al. "3D Sketch: Modeling by digitizing with a smart 3D pen"; Shokoufandeh, et al. "View-based object matching"; Hilaga, et al. "Topology matching for fully automatic similarity estimation of 3D shapes"; and Bober "MPEG-7 visual shape descriptors".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G. MARIAM whose telephone number is 571-272-7394. The examiner can normally be reached on M-F (7:00-4:30) FIRST FRIDAY OFF.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW BELLA can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


DANIEL G MARIAM
Primary Examiner
Art Unit 2624

May 9, 2006